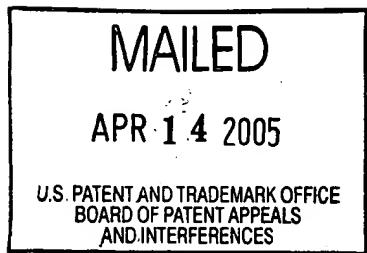


The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES



Ex parte SUJIT SHARAN  
and  
GURTEJ S. SANDHU

Appeal No. 2005-0822  
Application No. 09/825,612

ON BRIEF

Before DELMENDO, JEFFREY T. SMITH, and PAWLIKOWSKI,  
Administrative Patent Judges.

DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 (2004) from the examiner's final rejection of claims 13 through 18, 22 through 26, and 28 (final Office action mailed on Apr. 9, 2003), which are all of the claims pending in the above-identified application.

The subject matter on appeal relates to: (i) a method of making a semiconductor device (claims 13-18); (ii) a method of performing a "back-end-of-the-line process" (claims 22-26); and (iii) a semiconductor processing method (claim 28). Further details of this appealed subject matter are recited in representative claims 13 through 16, 22, 24, 25, and 28 reproduced below:

13. A method of making a semiconductor device, comprising the steps of:

forming a product in a PECVD<sup>[1]</sup> chamber through an interaction of a chemically inert charged species producer gas and a metal-containing compound in a plasma; and

exposing a substrate to said product.

14. The method in claim 13, wherein said step of forming a product comprises forming a product free of constituents of said chemically inert charged species producer gas.

15. The method in claim 14, wherein said step of exposing a substrate to said product further comprises forming a metal layer free of constituents of said chemically inert charged species producer gas.

16. The method in claim 15, wherein said step of forming a product further comprises forming a metal-containing ion of said metal-containing compound.

22. A method of performing a back-end-of-the-line process, comprising:  
providing a semiconductor device under

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<sup>1</sup> The present specification (¶¶0003 and 0005) indicates that "PECVD" denotes plasma enhanced chemical vapor deposition.

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fabrication;  
    placing said device in a vacuum chamber;  
    supplying a metal source gas and a chemically  
inert-excitation gas within said vacuum chamber; and  
    interacting said metal source gas and said  
chemically inert-excitation gas.

24. A method of making a semiconductor device using PECVD comprising:

providing a semiconductor device under fabrication;

placing said device in a vacuum chamber;  
forming combined gasses comprising a metal source  
gas with a chemically inert energy-transfer gas;  
supplying said combined gases to said vacuum  
chamber; and  
igniting a plasma.

25. The method in claim 24, wherein said step of igniting a plasma comprises interacting said combined gases.

28. A semiconductor processing method comprising the following steps:

providing a semiconductor wafer;  
subjecting said wafer to PECVD conditions in a  
chamber;

forming an ionized reactant species by interacting a metal source material with a chemically inert collider gas in said chamber; and

forming a metal-containing layer on said wafer from said ionized reactant species.

The examiner relies on the following prior art references as evidence of unpatentability:

Chang 6,294,466 B1 Sep. 25, 2001  
.  
(filed May 1, 1998)

Richard S. Müller and Theodore I. Kamins, Device Electronics for Integrated Circuits 102 (John Wiley & Sons 2<sup>nd</sup> ed. 1986) (Muller).

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Claims 13 through 15, 22 through 26, and 28 on appeal stand rejected under 35 U.S.C. § 102(e) as anticipated by Chang.

(Examiner's answer mailed Jan. 13, 2004 at 3-5; final Office action mailed Apr. 9, 2003 at 2-3.)<sup>2</sup> In addition, claims 16 through 18 on appeal stand rejected under 35 U.S.C. § 102(e) as anticipated by Chang, as evidenced by Muller.<sup>3</sup> (Answer at 5.)

We affirm these rejections.<sup>4</sup>

The appellants do not dispute the examiner's factual finding (answer at 3 and 6) that Chang discloses a method for making a semiconductor device comprising forming a product in a PECVD chamber using, inter alia, argon and TiCl<sub>4</sub> and exposing a substrate to the product. (Chang's column 3, lines 2-59.) Nor

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<sup>2</sup> It appears that the examiner inadvertently omitted claims 22-26 and 28 from the statement of the rejection. (See answer at 3 ["Status of Claims" and "Issues" section] and 4-5; final Office action at 2; appeal brief filed on Aug. 20, 2003 at 1-2.)

<sup>3</sup> "[E]xtrinsic evidence may be considered when it is used to explain, but not expand, the meaning of a reference." In re Baxter Travenol Laboratories, 952 F.2d 388, 390, 21 USPQ2d 1281, 1284 (Fed. Cir. 1991).

<sup>4</sup> The appellants state that the appealed claims "do not necessarily fall together" (appeal brief at 2) and provide reasonably specific arguments with respect to certain groups of claims in the "ARGUMENT" section of the appeal brief. Accordingly, we will consider multiple groups of appealed claims to the extent that the appeal brief complies with the requirements of 37 CFR § 1.192(c)(7)(2004) (effective Apr. 21, 1995).

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do they challenge the examiner's determination (answer at 6) that Chang's method involves the use of the same materials or reactants under substantially the same or similar conditions as those disclosed in the present specification. Rather, it is the appellants' principal argument that the appealed claims are patentable over Chang because the claims recite certain properties for the gas (e.g., argon) not recognized by Chang. (Appeal brief at 5.) According to the appellants, "merely pointing out the similarity in structure between the claim and prior art" is insufficient to establish that the argon gas used in the prior art method inherently or necessarily possesses the recited characteristics. (Id.) As support for this contention, the appellants rely on the holding in Crown Operations Int'l Ltd. v. Solutia, Inc., 289 F.3d 1367, 1377-78, 62 USPQ2d 1917, 1922-23 (Fed. Cir. 2002). (Id.; reply brief filed on Mar. 18, 2004 at 2.)

The appellants' position is not well taken. The court's decision in Crown was made in the context of patent litigation, where the patent in suit must be accorded a presumption of validity under 35 U.S.C. § 282 that may be overturned only by a showing of clear and convincing evidence. Crown, 289 F.3d at 1377, 62 USPQ2d at 1923. As the appellants may know, the

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evidentiary burden of proving invalidity of an issued patent rests on the party asserting it. Crown, 289 F.3d at 1377-78, 62 USPQ2d at 1923.<sup>5</sup>

No such presumption of validity under 35 U.S.C. § 282 exists in the context of patent prosecution before the United States Patent and Trademark Office (PTO) where a patent has not yet issued. As we noted above, the appellants do not challenge the examiner's factual findings that Chang discloses a method for making a semiconductor device comprising forming a product in a PECVD chamber using, inter alia, argon and TiCl<sub>4</sub> and exposing a substrate to the product under substantially the same or similar conditions as those disclosed in the present specification. In fact, the appellants candidly admit that the present specification identifies argon as an exemplary gas that performs the functions recited in the appealed claims. (Appeal brief at 5.)

Under these circumstances, it was appropriate on the part of the examiner (answer at 6, 11) to shift the burden of proof

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<sup>5</sup> Moreover, the court in Crown found it significant that Crown's inherency argument rested on the assumption that the prior art reference disclosed "the use of TiO<sub>2</sub>, even though it specifie[d] TiO<sub>x</sub>, where x is greater than 1.0 but less than 2.0" (emphasis added). Crown, 289 F.3d at 1377, n.2, 62 USPQ2d at 1923, n.2.

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to the appellants to show that the argon in Chang would not inherently or necessarily satisfy the functional limitations recited in appealed claims 13, 22, 24, 25, and 28. Cf. In re Schreiber, 128 F.3d 1473, 1478, 44 USPQ2d 1429, 1432 (Fed. Cir. 1997) ("[C]hoosing to define an element functionally, i.e., by what it does, carries with it a risk...[W]here the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on."); In re Spada, 911 F.2d 705, 708, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990) ("[W]e conclude that the Board correctly found that the virtual identity of monomers and procedures sufficed to support a prima facie case of unpatentability of Spada's polymer latexes for lack of novelty."); see also In re Best, 562 F.2d 1252, 1254-55, 195 USPQ 430, 433-34 (CCPA 1977). That Chang does not fully appreciate the functions (of argon) as recited in the appealed claims is of no moment. MEHL/Biophile Int'l Corp. v. Milgram, 192 F.3d 1362, 1366, 52 USPQ2d 1303, 1307 (Fed. Cir. 1999) ("Where, as here, the result is a necessary consequence of

what was deliberately intended, it is of no import that the article's authors did not appreciate the results."); In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990) ("It is a general rule that merely discovering and claiming a new benefit of an old process cannot render the process again patentable.").

With respect to appealed claim 16, the appellants contend: "Muller's electrically neutral plasma appears to be in conflict with the ions - electrically charged particles - of claims 16 and 17." (Appeal brief at 6.) This argument lacks merit. As discussed above, the substantial identity in the processes of the applied prior art and the appealed claims supports the examiner's position. The appellants have not discharged their burden of proving that the functions or results recited in the appealed claims would not inherently or necessarily occur in the prior art process. Muller, which the examiner cites for the proposition that a PECVD process is conducted in a closed chamber (answer at 9), merely states that a plasma is "an essentially neutral mixture of excited gaseous species." Furthermore, Chang expressly states that it is well known that a plasma, which is a mixture of ions and gas molecules, is formed by applying energy to process gas. (Column 1, lines 64.) Thus,

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contrary to the appellants' apparent belief, Muller's disclosure is by no means indicative of the absence of ions in Chang's PECVD process.

The appellants point out that "Chang's hydrogen is a plasma-forming gas, with argon included with it as an inert carrier." (Appeal brief at 8.) We note, however, that the appealed claims recite that the charged species producer gas, excitation gas, energy-transfer gas, and collider gas are all "chemically inert." Thus, Chang's disclosure that argon acts as an inert carrier by no means proves that the here recited functions are not inherent or necessarily present in the prior art.

The appellants allege that Chang "does not appear to express applying RF energy to argon." (Appeal brief at 13.) This allegation lacks factual foundation and is in direct conflict with the teachings of Chang. (Column 3, lines 39-43.)

We have considered the appellants' other commentaries in the appeal brief and reply brief but find none of them to be relevant, let alone sufficient to rebut the examiner's prima facie case of anticipation.

For these reasons and those set forth in the answer, we affirm the examiner's rejections under 35 U.S.C. § 102(e) of:

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(i) appealed claims 13 through 15, 22 through 26, and 28 as anticipated by Chang; and (ii) appealed claims 16 through 18 as anticipated by Chang, as evidenced by Muller.

The decision of the examiner is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED



Romulo H. Delmendo )  
Administrative Patent Judge )

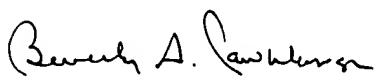


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Jeffrey T. Smith )  
Administrative Patent Judge )

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